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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/648,290

08/27/2003

Shun-Fa Huang

HUAN3209/EM

4458

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7590

03/09/2005

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EXAMINER

MALSAWMA, LALRINFAMKIM HMAR

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/648,290

Applicant(s)

HUANG ET AL.

Examiner

Lex Malsawma

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17, 18, 20-24 and 26-28 is/are rejected.
- 7) ☒ Claim(s) 19 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 18 and 23 are objected to because of the following informalities:

These claims are duplicates of claims 17 and 24, i.e., claims 17 and 24 already include limitations for a glass substrate.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 17, 18, 21, 23, 24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (5,403,772; hereinafter, "**Zhang**") in view of Jiroku et al. (6,602,765 B2; hereinafter, "**Jiroku**").

Regarding claims 17, 18 and 21:

Zhang discloses a heating plate crystallization method used in a crystallization process for a polysilicon thin-film transistor, the method comprising:

forming a glass substrate 1A (Col. 9, lines 31-34 or Col. 11, line 56);

forming an amorphous Si layer 1 (Fig. 2(A-2)) on the substrate;

depositing a heating plate layer on the amorphous Si layer;

forming a heating plate area 2 (of Cr, Col. 21, lines 29-30) by patterning the heating plate layer (Col. 12, lines 27-32), the heating plate area has an excellent absorption rate to infrared radiation and has high thermal stability (NOTE: words such as “excellent” and “high” are relative terms, therefore, these words can be readily used to described Zhang’s heating plate area 2); and

heating the heating plate area at temperatures greater than 700 °C (depending on the specific type of substrate used, note Col. 9, lines 31-34) so that the amorphous layer is crystallized to polysilicon (Col. 12, lines 55-58), wherein the heating can be performed utilizing a laser (Col. 18, lines 33-36).

Zhang **lacks** specifically utilizing a pulsed rapid thermal annealing process (P RTP) with infrared radiation to instantly and selectively heat the glass substrate. Jiroku **teaches** a process for crystallizing an amorphous silicon layer utilizing a heating-plate area in a manner similar to that disclosed by Zhang, i.e., both Zhang and Jiroku utilize a heating-plate area to “locally heat” a region of an amorphous silicon layer in order to crystallize the amorphous silicon layer. Jiroku teaches that it is desirable to utilize a pulsed laser with a wavelength in the infrared spectrum (i.e., approx. 710 nm, note Col. 9, lines 49-53 and Col. 4, lines 59-61, “a pulsed laser beam is

even better”). Jiroku teaches that utilizing a local heating-plate area 113 (Fig. 9B) in this manner significantly improves thin-film device characteristics (Col. 10, lines 31-40) because the process provides significant improvements in controlling grain boundaries (Col. 7, lines 9-31).

It would have been obvious to one of ordinary skill in the art to modify Zhang by specifically utilizing a pulsed laser operating in the infrared spectrum (as taught by Jiroku) because such a modification could significantly improve the characteristics of thin-film devices formed on the substrate (as disclosed by Jiroku)

Regarding claims 23, 24 and 27:

These claims are directed to a device acquired by the method of claims 17 and 18; therefore, these claims are held obvious over the cited references because all pertinent structural limitations within these claims are disclosed in claims 17 and 18.

5. Claims 20, 22, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zhang** (in view of **Jiroku**) as applied to claims 17 and 23 above, and further in view of Yamazaki et al. (6,087,245; hereinafter, “**Yamazaki**”).

Regarding claims 20, 22, 26 and 28:

Zhang (in view of Jiroku) discloses the claimed invention except for specifically utilizing MoW or W for the heating plate layer. However, it is important to note that Zhang discloses a list of suitable materials similar to those of the currently claimed invention (note Zhang, Col. 21, lines 29-30). Although Zhang **lacks** specifically disclosing MoW or W, Yamazaki **is cited to show** it was very well known in the art that Mo and W have properties and function similar to the materials listed by Zhang. Yamazaki discloses (in col. 5, lines 28-30) that Mo and W have

characteristics/properties/function similar to at least Cr, wherein the materials are essentially interchangeable insofar as absorption to near infrared rays is of concern.

I would have been obvious to one of ordinary skill in the art to modify Zhang (in view of Jiroku) by specifically using MoW or W for the heating plate layer because Yamazaki shows that Mo and W were well known to have properties/function similar to the materials specified by Zhang, wherein Mo and W are readily interchangeable with at least one of the materials (Cr) specified by Zhang.

Allowable Subject Matter

6. Claims 19 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

Claims 19 and 25 would be allowable primarily because the references of record cannot anticipate or render obvious the limitation for depositing/incorporating a thin oxide layer between the heating plate area and the amorphous Si layer in an amount effective to avoid metal pollution.

Remarks

8. Applicants' remarks/arguments have been carefully reviewed and considered, however, they are moot in view of the new grounds of rejection presented in this Office Action.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lex Malsawma whose telephone number is 571-272-1903.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lex Malsawma



March 2, 2005



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SUPERVISORY PATENT EXAMINER
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